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Assessment of capital expenditure in achieving sanitation-related MDG targets and the uncertainties of the SDG targets in Algeria

Nabil Kherbache^{a,b,*}, Kamal Oukaci^a

^a Laboratoire d'Économie et Développement (LED). Faculté des Sciences économiques, commerciales et des Sciences de gestion. University of Bejaia. Route de Tichy, 06000 Bejaia, Algeria

^b Institut de Recherche pour le Développement (IRD), UMR G-Eau, 361 Rue Jean François Breton, 34090 Montpellier, France

ARTICLE INFO

Keywords:

Algeria
Sanitation
MDGs
SDGs
Funding
Capital expenditure
Investment

ABSTRACT

This paper studies sanitation policy in Algeria by conducting an assessment of the capital expenditure on sanitation improvements between 2000 and 2018. It focuses on the period of implementation of the Millennium Development Goals (MDGs) between 2000 and 2015 and the first years of the Sustainable Development Goals (SDGs) from 2016 to 2018. The paper aims also to assess the level of subsidies for sanitation services in Algeria and the lack of full cost recovery. We then emphasise the idle capacity for wastewater treatment plants (WWTPs) and the risks of wastewater discharge on public health and ecological integrity. Our methodological approach is multidimensional and based on a critical reading of reports by institutions responsible for the implementation of sanitation policy. We used water and sanitation data from the water authorities to evaluate the funding of the sanitation subsector and to analyse the strengths and weaknesses of this sub-sector. This study was also facilitated by semi-structured interviews with executive staff in water institutions responsible for the implementation of sanitation policy in Algeria. In the period studied (2000–2018) we find that the sanitation subsector benefited from a significant investment budget (or budgetary allocations) of nearly US\$7.58 billion (in constant 1999 US\$), representing 20.53% of the total budget allocated to the water sector. However, the low absorption capacity, estimated at 62.7% between 2000 and 2015, meant that the capital expenditure of achieving MDG target 7.C related to sanitation was US\$4.38 billion (in constant 1999 US\$) out of US\$6.98 billion allocated for the same period. The study shows that the decline in real investment since 2009, with a funding gap that increased from 201.49% in 2015 to 385.56% in 2018, casts uncertainty on the fulfillment of SDG targets 6.2 and 6.3 related to sanitation. It is thus very difficult to meet the level of investment planned for 2030. It seems, therefore, that the SDGs will only be comfortably achieved if reforms towards the sustainable recovery of sanitation service costs are undertaken.

1. Introduction

Sanitation has drawn increasing international attention over recent decades. In September 2000, 191 countries gathered under the aegis of the United Nations (UN) to set new development priorities. The meeting gave rise to the Millennium Declaration in which all participating states pledged to meet eight major goals by 2015, commonly known as the Millennium Development Goals (MDGs). Hugon (2016) describes the MDGs as concentrated, identical and straightforward in terms of the percentage to be achieved, while Bhagwati (2010) calls them ambitious and well-intentioned goals that are often endowed with a quantitative dimension that must be achieved within a specific time frame which covers various and chosen domains. Sanitation was identified in Target

7.C of Goal 7: 'By 2015, halve the proportion of people without sustainable access to safe drinking water and basic sanitation' (UN, 2000). This sanitation aspect of the target was added at the Earth Summit in Johannesburg in 2002. Further, water protection is implicitly mentioned in Target 7.A: 'Integrate the principles of sustainable development into country policies and programs and reverse the loss of environmental resources' (UN, 2000). Nevertheless, it is already recognised that the achievement of several other goals requires an improved basic sanitation service (Kherbache and Oukaci, 2017). Sanitation is a global development challenge, as, in 2015, 61% of the world's population lacked access to safely managed sanitation services and 892 million people continued to practise open defecation (UN, 2018; Perard, 2018).

* Corresponding author at: Laboratoire d'Économie et Développement (LED). Faculté des Sciences économiques, commerciales et des Sciences de gestion. University of Bejaia. Route de Tichy, 06000 Bejaia, Algeria.

E-mail addresses: kherbachenabil@gmail.com (N. Kherbache), oukacikamal@yahoo.fr (K. Oukaci).

<https://doi.org/10.1016/j.wdp.2020.100236>

Received 17 November 2019; Received in revised form 24 May 2020; Accepted 9 July 2020

Available online 23 July 2020

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Following noted progress in several regions of the world, a decision was taken at the United Nations Conference on Sustainable Development (RIO + 20 Summit) held in Rio de Janeiro from 20 to 22 June 2012 to start negotiations to replace the MDGs with a post-2015 agenda of Sustainable Development Goals (SDGs) (Hugon, 2016). As a result, the 2030 Agenda for Sustainable Development was adopted in September 2015 at a historic United Nations summit, and on January 1, 2016, the SDGs came into force. They are now considered to be the most ambitious global development goals in history. They fill the gaps in the MDGs and change the paradigm of development cooperation (Herrera, 2019).

Several goals directly relate to sanitation, including targets 6.2 and 6.3 of SDG 6: 'Ensure availability and sustainable management of water and sanitation for all' (UN, 2015; 2018). Several other SDGs require the prior fulfillment of Goal 6, as well as huge investment (Perard, 2018). While Herrera (2019) highlighted contradictions between Goal 6 targets and other SDGs, Mugagga and Nabaasa (2016) showed the centrality of water resources in achieving the SDGs in Africa. They cited 42 examples of interdependency between water and the 169 targets of the 17 SDGs.

The provision of healthy sanitation services and downstream treatment reduces the pollution of the natural environment and water resources, thereby enabling the use of the return flow after various uses in agriculture. The lack of a basic sanitation system also hampers girls' schooling, especially during their menstruation period. Therefore, improving sanitation services contributes to the achievement of Goal 4: 'Ensure inclusive and equitable quality education...' and to achieve gender equality (Goal 5). Similarly, the lack of a healthy and adequate sanitation system prevents the achievement of Goal 11: 'Make cities and human settlements inclusive, safe, resilient and sustainable', hence the structural and complex role of sanitation within the SDG paradigm. A lack of access to sanitation services has a direct impact on GDP, according to a survey of 18 African countries. Economic losses in terms of GDP are estimated between 1% and 2.5% and at 7.2% in Cambodia (Perard, 2018).

Algeria, as many developing countries, has suffered greatly from the problems associated with poor sanitation services. However, it is universally recognised that Algeria succeeded in the challenge of water use and sanitation between 2000 and 2018. This period is considered an exit from the economic water scarcity that prevailed prior to 1999 when total real investment in the water sector did not exceed 216.49 billion Algerian dinars (DZD) (~US\$8.31 billion) (constant 1999) between 1990 and 1999¹ (Kherbache, 2014; Rijsberman, 2006; Molden et al., 2003, 2007). In fact, following the rise in oil prices a significant financial windfall has enabled the state to move in the direction of a voluntarist public investment policy (public investment programmes [PIPs]).² Consequently, since 2000 Algeria's adaptive capacity has improved, allowing it to enter 'structurally induced relative water abundance' (SIRWA) with a scarce resource (first-order resource) and a high adaptive capacity (second-order resource) (Turton, 2002; 2000; Turton and Ohlsson, 1999; Ohlsson and Turton, 2000; Kherbache, 2014). The total amount authorised in these PIPs during the MDG implementation period between 2000 and 2015 reached US\$33.99 billion (constant)

¹ This means an annual investment of DZD21.65 billion (~ US\$831 million) (constant) against an average of DZD94.47 billion (~ US\$1.32 billion) between 2000 and 2015. Consequently, the increase in public investment was significant, with a 336.35% increase between the two periods in terms of DZD constant and 59% in terms of constant \$US due to the devaluation of the DZD in this period.

² The economic recovery plans or PIPs were adopted in 2001. They are presented by: the Economic Support and Recovery Programme (ESRP) (2001–2004), the Complementary Growth Support Programme (CGSP) (2005–2009), the Economic Growth Consolidation Programme (EGCP) (2010–2014) and the Economic Growth Support Programme (EGSP) (2015–2019).

(DZD2549.28 billion [constant]), while the actual volumes consumed for the same period were in the order of US\$21.18 billion (or DZD1580.61 billion), namely, an average absorption rate of 62.31%.

The investments and institutional reforms that took place between 2000 and 2019 spearheaded improvements in water indicators in Algeria. The financial expense meant an assessment was necessary. According to the official discourse, the country met the MDG targets related to drinking water and sanitation in 2012 – before the UN deadline of 2015. The majority of the Algerian population now had access to safe drinking water, with a connection rate of 98% in 2016 compared to 78% in 1999, and, similarly, Algeria achieved the sanitation facilities target (see below) (MREE, 2017; Kherbache and Oukaci, 2017; MAE, 2019). Furthermore, water supply infrastructure improved considerably over these two decades. For example, the number of operational dams rose from 46 in 1999 to 80 in 2019 (of 124 dams planned by 2030). The equipped area reached 225,304 ha (ha) in 2017 compared to 156,000 ha in 1999. Although the situation is in general satisfactory there are differences between subsectors, and bottlenecks appear in several, specifically drinking water (Kherbache and Oukaci, 2017) and sanitation subsectors. In fact, the increase in drinking and industrial water withdrawals, estimated at 3.6 Bm³ in 2016, implies an increase in wastewater discharge, since approximately 80% of the withdrawn water is returned to the sewer system (Tecsult, 2007; Contreras and Hunink, 2015). Where infrastructure is lacking, or dysfunctional water quality could deteriorate, thus causing potentially irreversible pollution. In addition, there is often no separation between the rainwater and wastewater networks in Algeria. Therefore, as part of its water policy (Law No. 05–12 of August 4, 2005 related to water) the country has undertaken concrete action to water protection.

This paper aims to pinpoint the strengths and weaknesses of Algeria's sanitation policy with regard to the SDG targets. We look at capital expenditure in relation to sanitation service improvements between 2000 and 2018, focusing on the MDG implementation period between 2000 and 2015 and the first three years of SDG implementation between 2016 and 2018. The interest of this work lies in the absence of economic evaluations of public action³ in water subsectors such as sanitation in Algeria. During the period 2000 to 2018 sanitation benefited from significant financial envelopes of around US\$7.58 billion at constant prices or 20.53% of the total dedicated to the water sector (US\$36.92 billion). This paper then questions the decline in real investment, especially since 2015 although it has been occurring since 2009, in the face of growing investment needs in the subsector projected to 2030. This creates uncertainty around the achievement of the sanitation targets in Goal 6 of the SDGs.

2. Theoretical framework, methodology, and data sources

2.1. Theoretical framework

Our analysis takes the model of sustainable development as proposed by Flint (2004) as a theoretical framework. This model is based on three dimensions: social equity, economic vitality and ecological integrity, of which this paper is interested in the last two. The economic component is analysed on the basis of the work of (Perard, 2018), who sees the financial challenge for sanitation as lying in the lack of financial sustainability at the sector level rather than in the total investment needed to improve the service. The problem of financial

³ In the current scientific work on Algeria there is no economic evaluation of the MDGs or SDGs, particularly in the water sector. This phenomenon is explained by the difficulties of access to water sector financial data and an omission of economic variables, hence the lack of information and transparency (information gap) in the hydraulic accounts in favour of physical infrastructure implementation (see OECD [2012] and Charbit [2011] for more detail on the information gap).

sustainability is particularly apparent in the case of centralised investment planning and low tariffs, which impede the coverage of the operation and maintenance (O&M) costs.

Scientific work on the issues around the MDGs and SDGs has been relevant in our study (Hugon, 2016; Herrera, 2019; Nhamo et al., 2019; Mugagga and Nabaasa, 2016). Yet, according to Herrera (2019), if we want to succeed in the challenges of the SDGs, we must review the successes and failures in the implementation of MDG Target 7.C. Therefore, we make an economic assessment from the capital (investment) expenditure, since the economic aspect is crucial in ensuring the financial sustainability of sanitation services and projects (Perard, 2018). We also give a critical reading of the Algerian political discourse that praises the general achievement of the MDGs and promises to achieve the SDGs, taking sanitation as a field of analysis. This type of discourse is not specific to decision-makers but is also found in United Nations reports related to the assessment of the achievement of the MDGs (UN, 2011; UNa, UN, 2014b) and in some scientific papers, such as Nhamo et al. (2019). Indeed, the targets must be quantifiable, concrete, concise and easy to understand, which explains why an analysis of the global indicators is insufficient without regard to the contrasts within the subsectors concerned. Comparisons based on international indicators *ipso facto* become insufficient and should in no way supplant statistics disaggregated by sector, or even by geographical region, and detailed studies specific to each country (Hugon, 2016). An assessment based on the SDG targets is needed to avoid previous errors made in the assessment of the MDGs. This study does not deny the sector's achievements but highlights certain anomalies in an attempt to make decision-makers aware of possible improvements.

2.2. Methodology and data sources

To meet the objectives of the study our methodological approach is multidimensional and structured around the sanitation subsector, MDG target 7.C and SDG targets 6.2 and 6.3. The research is based on a thorough and critical reading of the scarce documents and research works dealing with sanitation services in Algeria (Toumi and Chocat, 2004; CNES, 2000), with an institutional and regulatory framework analysis of sanitation. A regulatory framework was employed for instance in the analysis of sanitation subsidies (sub-Section 4.2) and the understanding of the role of water police in the sanitation sub-sector (sub-Section 4.4). We also used the National Water Plan (NWP) (*Plan National de l'Eau [PNE]*) reports updated in 2010, studies of the sanitation subsector, such as Tecsub (2007), and the report on the water sector strategy for 2035 adopted by the government in 2017 as part of the new model for economic growth in Algeria (NMCE).⁴

We used the most recent data on sanitation and funding/investment in this subsector in Algeria through the disaggregation of data from the water sector. These data were provided to us by the Ministry of Water Resources (MWR)⁵ – mainly by the Directorate of Planning and Economic Affairs (DPAE), the National Sanitation Office (NSO) (*Office national de l'assainissement [ONA]*) and Integrated Water Resources Management Agency (*Agence Nationale de Gestion Intégrée des Ressources en Eau [AGIRE]*). Some data was also extracted from the NWP database

as updated in 2018 (sub-Section 4.2).

Funding in Algeria's water sector is allocated by sub-sector, namely drinking water (or water supply/adduction), sanitation, dams, irrigation, drilling, small dams and hillside reservoirs, and general studies. By focusing on the funding of sanitation in particular it is possible to assess the capital expenditure of achieve MDG Target 7.C related to sanitation, using a more detailed approach than that used in Kherbache and Oukaci (2017). The paper provides an economic assessment of sanitation in the first three years of the implementation of the SDGs as well as a comparison between the objectives and achievements. The cost assessment for the period 2000 to 2018 includes all the PIPs as presented in the MWR annual plans for the capital budget (capital expenditure). Indeed, we used the capital expenditure canvas (Excel files) between 2000 and 2003 and all the reports on the implementation of the annual plan between 2004 and 2018. The study covers centralised sectoral programmes (CSP), managed by the MWR or water institutions with financial autonomy, and decentralised sectoral programmes (DSP) managed at the local level, in other words by the Water Resource Departments (WRD) in each wilaya.⁶ Communal development plans (CDPs), which are managed at the sub-national level (local authorities), come from the budget of the Ministry of the Interior, Local Authorities and Land-Use Planning (*Ministère de l'Intérieur, des Collectivités locales et de l'Aménagement du territoire [MICALT]*). Our assessment of sanitation subsector funding will, therefore, be limited to the first two programmes, CSP and DSP. The assessment remains significant as it incorporates most of the sanitation investment plans. Expenditure was reported by the MWR in the current Algerian dinar (DZD). For reasons of comparison and analytical relevance we have deflated the figures against the Gross National Expenditure Deflator whose reference year is 1999 according to Medianu and Whalley (2012). The deflator is derived from the World Bank database.⁷ There were two reasons for the choice of 1999 as the reference year – namely its concurrence (almost) with the launch of the MDGs and PIPs and the lack of any other deflation index of investment in Algeria. The amounts that will be presented in US\$ were converted (from constant DZD to constant US\$) using a series of exchange rates between 2000 and 2018. This was calculated by the World Bank as an annual average based on monthly averages and refers to the exchange rate used by the Bank of Algeria. This quantitative aspect of our methodology is presented in Section 3, sub-Section 4.1 and Section 5.

With the aim of analysing the objectives of Algeria's sanitation policy, as well as identifying the obstacles and improvements it has seen, our study was supplemented by discussions and interviews with officials at institutions involved in its implementation. We also conducted site visits of ongoing or completed projects which are seen as the reference for the water supply model in Algeria (Kherbache, 2020). We then held 23 semi-structured interviews between February 2015 and June 2019 with senior officials in the sanitation subsector, including MWR central directors and directors of water authorities. The interviewees were selected on the basis of their involvement in decision-making and investment-planning in the sanitation sub-sector. They are mainly members of the following central directorates: the DPAE, the Directorate of Sanitation and Environmental Protection (DAPE) and the Directorate of Hydraulic Studies and Engineering (DEAH).⁸ The findings were implicitly incorporated into the analysis because the majority of the directors refused to be explicitly mentioned in the work,

⁴ On July 26, 2016 the Council of Ministers adopted the NMCE (*le nouveau modèle de la croissance économique*), which aimed to diversify the economy and ensure socio-economic development by 2035. The strategy of the water sector focuses on, 'the quantitative and qualitative satisfaction of the population's water demand and water-consuming productive activities, while ensuring the preservation of the living environment and water resources through sanitation' (MREE, 2017, p.20).

⁵ The MWR was founded in 1999. Following a governmental reform on 14 May 2015 it became known as the Ministry for Water Resources and the Environment (MWRE) (*Ministère des Ressources en Eau et de l'Environnement [MREE]*) before returning as the Ministry of Water Resources (MWR) in May 2017.

⁶ The *wilaya* is an Algerian administrative division (the country is divided into 48 wilayas) and is the equivalent of a department, region or province in other countries.

⁷ <https://donnees.banquemondiale.org/indicateur/NE.DAB.DEFL.ZS?locations=DZ&view=chart> accessed on 6 December 2019.

⁸ DPAE: Direction de planification et des affaires économiques. DAPE: Direction de l'assainissement et de la protection de l'environnement, and DEAH: Direction des études et des aménagements hydrauliques.

preferring to remain anonymous. This part of the methodological approach was used to assess their awareness of the weaknesses of the sanitation policy in Algeria. The key results here were the identification of the main causes of the low absorptive capacity that have not been studied in the literature (sub-Section 4.1), the reasons for the idle capacity of the WWTPs and the current state of the sanitation sub-sector, such as the understanding of the role of the water police and the chronology of certain funding reforms (sub-Sections 4.2–4.4).

The article is structured around three axes. The first is an assessment of the capital expenditure involved in achieving the targets of the MDGs related to sanitation between 2000 and 2015 according to the objectives of the PIPs initially planned. The second is a critical analysis of this planning based on anomalies observed on the ground, such as the weak capacity to absorb funds, an ineffective endogenous financing⁹ cycle, the underutilisation of the equipment installed, the public health hazards, and ecological sustainability due to uncontrolled releases. Thirdly, we conclude with a view on planned investment up to 2035 by highlighting the uncertainties and risks of instability in budget indicators owing to the oil counter-shock. An assessment of the funding gap – i.e. that between the planned programme and actual investment – was carried out during the transition from the MDGs to the SDGs between 2015 and 2018.

3. The capital expenditure of meeting MDG sanitation targets: public funding as the source of improvements between 2000 and 2015

In the economic assessment of the MDGs there is a gap between decision-makers who position themselves praxeologically¹⁰ and scientists who adopt critical approaches and measures in terms of costs and benefits (Hugon, 2016). The improvements in water and sanitation services in Algeria were the result of a proven effort in terms of funding and investment projects (Kherbache and Oukaci, 2017; Kherbache, 2014; Akli et al., 2016). As part of this largely budget-based policy¹¹ major financial envelopes have been allocated to subsectors identified as priorities. Sanitation had suffered from under-funding from 1990 to 1999, where the average annual budget allocations (payment appropriations) did not exceed DZD4.37 billion (constant), with a level of DZD 3.25 billion (constant) (US\$48.83 million) or a per-capita allocation of no more than US\$2 in 1999. It was only once the economic recovery plans (PIPs) were put in place that investment increased. Sanitation ranked third from 2000 to 2004 after the water supply/adduction and dam subsector and second after water supply/adduction throughout the period from 2005 to 2015. In order to gauge the importance placed on the sanitation subsector, as well as the capital expenditure of the rise in sanitation indicators and thereby the achievement of the MDG targets, we provide the payment appropriations (PA) and the share accorded to sanitation from the total water sector budget in Fig. 1.

The right to water and sanitation is recognised in Article 3 of Law No. 05–12 related to water. This prioritises domestic need as well as protecting water through sanitation. In other words, supplying water in sufficient quantity and quality is a priority for the needs of individuals and watering livestock, and achieving it requires a commitment to

heavy investment. Most of the sector's budget has been allocated to the supply of drinking water, extending water distribution networks and sanitation. During the MDG implementation period (2000–2015) the subsector benefited from a significant budget of nearly **US\$6.98 billion** (constant), representing 20.53% of the total investment budget allocated to the water sector (US\$33.99 billion). This share has been subject to several trends. It amounted to 15% in 2000 and 10% in 2002 before rising steadily to the 30% threshold in 2006. This fell to 16% in 2011, followed by a further increase to 27% in 2015 (Fig. 1). Whereas the share directed to sanitation has not shifted significantly in relative terms since the 1990s, averaging 18%, the total allocations have changed considerably. Budget allocations for sanitation increased substantially from US\$66.2 million (constant) in 2000 to US\$171.2 million in 2004 before beginning the most significant expansion between 2005 (US\$305 million [constant]) and 2009 (US\$739.3 million) with a per-capita allocation of US\$21 (Fig. 1). In 2010 recorded investment decreased to US\$625.7 million (constant). This is explained by a drop in oil prices in 2009 to 32.2 US\$/barrel after reaching a peak in 2008 of 145.3 US\$/barrel hence the prudence in the allocation of the capital budget. The decline continued until 2015 with US\$436 million (or a per-capita allocation of US\$11). These allocations have since begun a downward trend due to major structural projects and the beginning of a restrictive budgetary policy (capital expenditure component) in Algeria, especially with the ongoing oil counter-shock which has forced the government to suspend a large number of projects and prioritise projects already in construction. These indicators show that decision-makers are devoting particular attention to solving the problem of water protection through sanitation and wastewater treatment but that performance remains dependent upon funding. Thus, strategic financial planning (SFP) and a financing strategy as per the *OECD* (2010) come to play a central role. Indeed, the SFP is based on multi-stakeholder engagement among water operators to reach a consensus on water sector financing and address the obstacles to improving absorptive capacity.

As a result, overall sanitation indicators have improved significantly. It should be noted, for example, that, according to MRE data, the rate of connection to sanitation networks increased from 72% in 1999 to 90%¹² in 2015, the linear length of networks from 21,000 km in 1999 to 47,000 km in 2019, with a favourable development perspective in the medium term. In addition, the number of WWTPs in operation in Algeria was estimated at 12 in 2000, with a treatment capacity not exceeding 90 Mm³/year. In 2013 they had an estimated capacity of 12.4 million equivalent inhabitants. In 2016 Algeria had 177 WWTPs (compared to 12 in 1999), 87 of which are managed by the National Sanitation Office (NSO) with an installed capacity of 805 Mm³/year. A construction programme was launched to build 66 additional stations with a capacity of 266 Mm³ (MREE, 2017). These theoretical amounts and indicators are often used in the official discourse to bear witness to the achievement of the MDG targets related to sanitation, particularly Target 7.C. For example, in early 2013 the Minister of Water Resources, referring to the sectors' achievements, stated that '2013 will be the year of the eradication of all septic tanks' (Mozas and Ghosn, 2013).

4. MDG Target 7.C related to sanitation: From claims of achievement to local realities

The indicators used to attest to the achievement of Target 7.C remain simple and reductive and are not able to quantify a given objective considering the complexity of socioeconomic factors (Hugon,

⁹ In Algeria there are two components of water sector funding. One is external through state expenditure and the other comes from within the water sector (pricing, taxes, etc.). In this paper we distinguish the two by exogenous funding for the former and endogenous funding for the latter (see Kherbache, 2020).

¹⁰ Praxeology is the study of human action without making value judgments. This concept is used by Hugon (2016) to explain and criticise the poverty of aggregate MDG indicators based also on political trade-offs.

¹¹ The great projects realised in Algeria are also energy-intensive because the costs are very high and they do not use renewable energy (solar) although the climate is favourable (28.2 DZD/m³ just for energy in the case of the In Salah-Tamanrasset transfer).

¹² This rate disguises significant disparities between wilayas (see Toumi and Chocat, 2004). For instance, the connection rate is estimated at 80% in rural areas and the gap between the official rate and the estimated real rate was 34% in 2006 (World Bank, 2007).

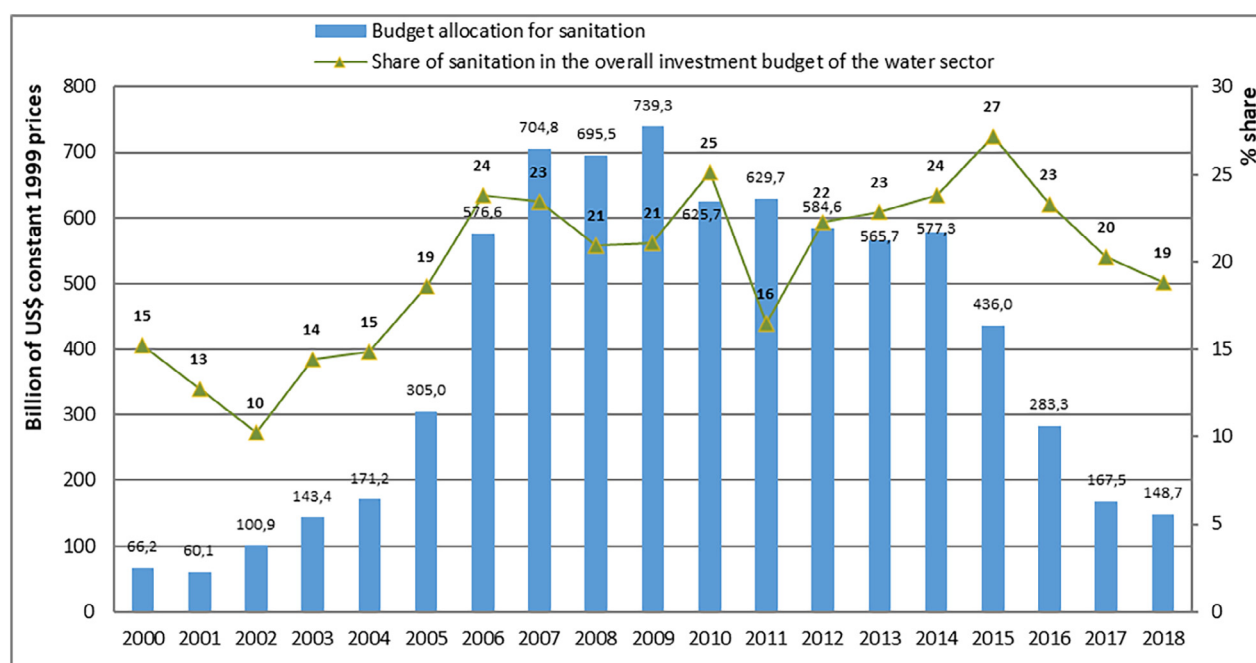


Fig. 1. Evolution of investment allocations and the share of payment appropriations in the sanitation subsector.

2016). Likewise, Herrera (2019) sees the indicators of access to water and sanitation as over-aggregated and having failed to capture variations in the quality, quantity, accessibility and sustainability of services. These hide significant anomalies that nuance the discourse of achieving Target 7.C. The same indicators are used in Algeria to audit the implementation of the SDGs (Cour des comptes, 2018; MAE, 2019). This leads us to discuss some of the biggest challenges to Algeria's sanitation subsector and the achievement of the SDG targets by 2030.

4.1. Low absorptive capacity: Why the gaps between allocated funds and real investment?

Although the concept of absorptive capacity, popularised by Cohen and Levinthal (1990), is specific to the theory of innovation and learning within an organisation, it is used in this study as the capacity to consume appropriations allocated in public finance. For us, absorptive capacity is an institutional construct explained by interdependent factors with complex relationships, rather than simple budgetary constraints as often claimed by officials and the World Bank (2007). Indeed, this capacity is dependent on several exogenous and endogenous factors in the water sector. The Algerian authorities still only refer to annual budget allocations to the water sector and rarely mention the amounts invested, which represent the real cost of achieving the MDG targets. Although the investment budget for the sanitation subsector has increased significantly since 2000, the absorption of these funds remains modest, with an estimated average rate of 63.4%. That is, of the US\$6.98 billion authorised between 2000 and 2015 the subsector in fact absorbed only US\$4.38 billion. This amount is considered as the real capital expenditure costs of achieving part of target 7.C, especially the parts related to sanitation. Indeed, the absorption rate between 2000 and 2004 was relatively high at 90.3% and 90.5% respectively. Yet, with increased investment from 2005 onwards absorptive capacity declined continuously to 42.3% in 2011 and 41.8% in 2012 (Fig. 2). The improvement in absorptive capacity since 2012 is due to the decline in the budget allocations and the continued devaluation of the Algerian dinar, which has lost around 59.8%¹³ of its value against the

dollar since 2014.

The issue of low budget absorption must be central to any analysis of water policy problems. Investigation is needed into the roots of the discrepancies between budget allocations and the reality of expenditure in the sanitation subsector, or even in all water subsectors and sectors of the Algerian economy in general. Yet in practice this has not been carried out by sanitation stakeholders, namely public actors, decision-makers or governmental agencies. They are limited to generic analyses that conjure insurmountable obstacles and fail to offer solutions. To explain the gaps that existed in the 1970s and 1980s Pérennès (1993) referred to the complexity of hydraulic works and the multiplicity of companies working on the projects after independence,¹⁴ which often failed to honour contracts. However, the sanitation managers and policymakers interviewed as part of the study explain the weakness in the sector's absorption capacity from 2006 to 2016 (Fig. 2) by the following factors (Kherbache and Oukaci, 2017):

- Slow public procurement (contract) procedures and lack of relief from these procedures.
- Complex expropriation processes without rigorous application of regulatory texts.
- Insufficient budget allocated to certain projects due to weak project studies and cost-analysis methods.
- Halting projects due to bad weather, climatic conditions (high temperatures in the case of transfer of In Salah-Tamanrasset) and disrupted supply of raw materials, although major projects have priority in law.
- Intra-sectoral and intersectoral interferences (particularly with the transport, energy and housing sectors) between projects despite coordination and consultation bodies existing to deal with such issues.

The low absorption capacity can also be traced to a lack of

(footnote continued)

marcheint2.htm accessed on April 24, 2020.

¹⁴ These included French companies who had operated during the colonial period, as well as companies from Italy and sometimes Germany, Romania, Yugoslavia, etc.

¹³ In April 2020 US\$1 was exchanged for 128,75 DZD compared to 80.58 DZD in 2014, a loss of more than 48.17 DZD. <https://www.bank-of-algeria.dz/html/>

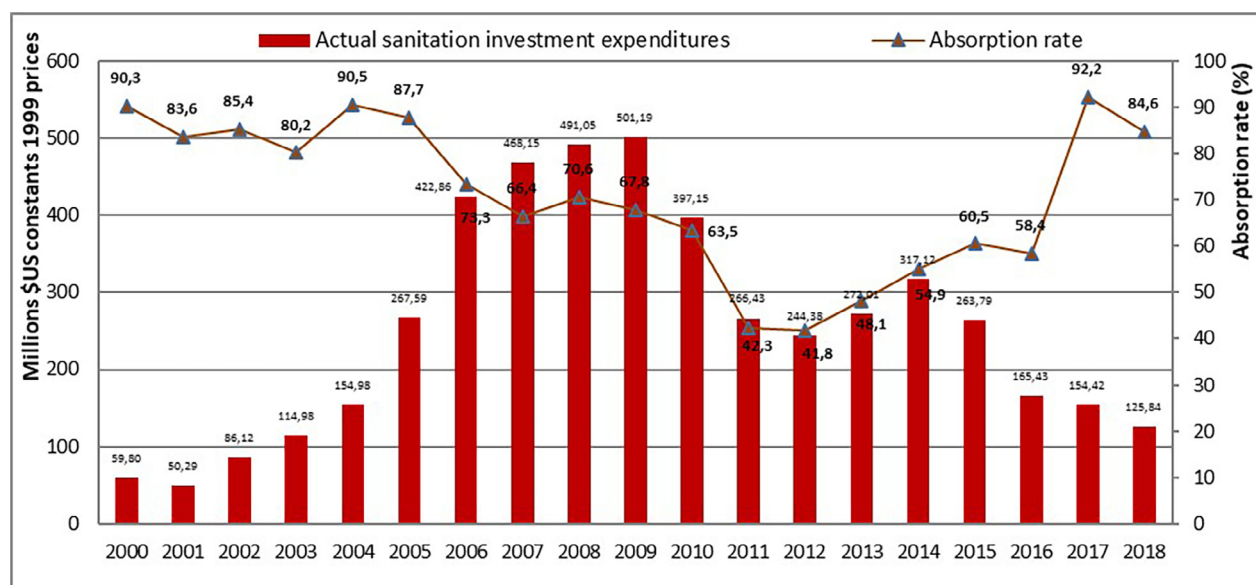


Fig. 2. Actual investment expenditures and absorption rate of sanitation subsector.

competence on the part of the companies¹⁵ carrying out projects. According to an official at the MWR, ‘companies operate at their own rhythm in the realisation of projects since they are not numerous and are faced with administrations that lack resources (in the case of municipalities). Sometimes they work for the benefit of these administrations free of charge, such as cleaning or unblocking road closures after bad weather. On the other hand they benefit from the project’s contracts despite not meeting the required conditions or qualifications. Those in charge have neither the capacity nor the will to revoke the implementation contract because of this relationship, which becomes more “friendly” than professional or contractual’. Furthermore, certain companies have the political influence to prevent a contract’s termination despite the project stalling and the funding not being absorbed. One senior water sector executive termed such companies ‘hydraulic political lobbies’.

4.2. An ineffective endogenous funding cycle and excessive subsidies

In parallel to the water sector’s exogenous funding provided by the state, which has shown its limits, there is also endogenous funding. This relies on using the pricing system (tariffs), various taxes and transfers (the so-called ‘3Ts’ [OECD, 2010]), as well as donations from philanthropic foundations (Nhamo et al., 2019; Bhaduri et al., 2016). The water policy targets several objectives with this system, namely ecological sustainability, in the sense that water is a natural and vulnerable resource that must be protected, economic efficiency, in the sense that water has an economic value, hence the need for optimal allocation, and financial sustainability, because water services come at a cost and require infrastructure. Financial equilibrium is also required; social issues are important, given a large number of poor households for whom a vital service must be provided (OECD, 2010). Nhamo et al. (2019) made the achievement of MDG 6 conditional on the existence of mixed financing, particularly as water infrastructure remains highly capital intensive. Regulation exists in Algeria to set and administer charges for drinking water and sanitation services, as per Executive Decree No. 05–13 of January 9, 2005, which is based on the following principles: the financial equilibrium of the operator so as to ensure the sustainability and viability of the infrastructure, national solidarity in

accordance with the objective of social equity, an incentive to save water through the price signal and protection of the quality of water resources (article 138 of Law No. 05–12). Successfully harmonising these aspects would be a source of sustainable water resources management, and this is the core of Integrated Water Resources Management (IWRM).

Sanitation services, like water, are charged quarterly, and, as in many other countries, water companies put them on the same bill as drinking water (Perard, 2018). Prices are differentiated according to categories of user. Category 1 concerns households; category 2 corresponds to administrations, artisans and services in the tertiary sector; and category 3 applies to industrial and tourist units. Pricing is established by the territorial tariff zone.¹⁶ It should be noted that a basic tariff for public sanitation services is determined for each of the five existing zones. This varies between 2.1 and 2.35 DZD/m³ with a fixed sanitation tax ranging from 60 DZD to 2100 DZD (between US\$0.55 and US\$19.263), depending on the category of user. As with the drinking water service, sanitation is heavily subsidised in relation to the actual cost of wastewater treatment. The pricing does not even cover operational costs. The cost of wastewater treatment varies from one plant to another and from one region to another but remains far higher than sanitation tariffs. A 2003 study of drinking-water pricing cited a sanitation cost in Algeria ranging from 31.5 DZD/m³ to 35 DZD/m³. Obviously, this has changed since then, and evolution is noticeable. We have chosen to calculate the subsidies in relation to the real cost for some WWTPs in the Oran zone of Algeria, notably in the wilaya of Mascara in 2016, whose wastewater treatment costs range from 31.35 to 66.5 DZD/m³ (Table 1). According to the tranches, the household category receives a subsidy of 71.5% to 95.6% for the El Keurt plant, 77% to 96.5% for the Hacine plant and 24.2% to 43.6% for the Taria wadi plant.¹⁷ The most striking conclusion is that all categories of user benefit from the subsidy, including the greatest users and polluters,

¹⁶ Each zone includes several wilayas of the country. It should be noted that prior to the pricing reform in 2005 the sanitation tariff was 20% of the water bill (pre-tax value) (CNES, 2000).

¹⁷ It should be noted that even if we include the complementary tax on industrial wastewater, the subsidy remains high. In fact, this tax was introduced in the 1992 Finance Act (LF) and amended by Article 54 of the LF (2000), the annual rate of which has not changed, varying from DZD 2,000 (US\$15.53) to DZD 120,000 (US\$932.06). Yet, the tax is often not charged and therefore does not reduce the subsidies to sewage treatment costs.

¹⁵ Incompetent and unqualified companies were also cited by Akli et al. (2016).

Table 1
Wastewater treatment subsidies for some plants in the Oran zone in 2016.

Category	Consumption tranches	Applicable sanitation tariff (DZD/ m ³) (pre-tax value)	Subsidy in % to El Keurt plant (Cost of treated water 53.55 DZD/m ³)	Subsidy in % to Hacine plant (Cost of treated water 66.5 DZD/m ³)	Subsidy in % to Taria wadi plant (Cost of treated water 31.35 DZD/m ³)
Households	1st tranche: 0 to 25 m ³ /quarter	2.35	95.61	96.47	43.61
	2nd tranche: 26 à 55 m ³ /quarter	7.64	85.73	88.51	35.65
	3rd tranche: 55 à 82 m ³ /quarter	12.92	75.87	80.57	27.71
	4th tranche: + 82 m ³ /quarter	15.27	71.48	77.04	24.18
administrations, artisans and services	Uniform	12.92	75.87	80.57	27.71
industrial and tourist units	Uniform	15.27	71.48	77.04	24.18

Source: authors based on NWP data (2018)

namely administrations and industrial and tourist units (see [sub-Section 4.4](#)). These large users receive a subsidy of 71.5% at El Keurt plant, 77% at Hacine plant and 24.2% at Taria wadi plant. Wastewater treatment service subsidies were calculated by plant. The real cost would be higher if it included the share of the cost for services upstream of the WWTPs. This calls on the public authorities to consider the financial sustainability of such a management model in the long term. However, according to [Perard \(2018\)](#), there is a low willingness to pay (WTP) for sanitation services, which creates political pressure to keep sanitation tariffs low.

Article 174 of the Finance Law (1996) introduced a tax called the 'water quality protection tax',¹⁸ which aimed to preserve water quality by funding measures to prevent pollution. The rate is 4%¹⁹ of the drinking, industrial and agricultural water bill for the wilayas in the north of the country and 2% for those in the south. It should be noted that even users who are not connected to a water distribution network, whether drinking, industrial or agricultural,²⁰ are liable. Operators such as the National Irrigation and Drainage Office (NOID), River Basin Agencies (RBA), Municipal Authorities and the NSO are tasked with collecting this tax and transferring it to a special treasury account called the National Water Fund (FNE)²¹ (Finance Law, 2015).

The pricing system gives importance to sanitation. However, this system contains weaknesses and anomalies that hamper cost recovery. Taxes are not able to provide sustainable funding where subsidies are excessive. The cycle of endogenous water funding in Algeria is marred by three multi-level governance gaps, as termed by the [OECD \(2012\)](#) and [Charbit \(2011\)](#). There is a *funding gap* due to difficulties encountered by water stakeholders (including Algerian Water Company [AWC]: *Algérienne Des Eaux [ADE]*) and municipal authorities) in applying tariffs and recovering costs associated with the service. Several water institutions, such as the AWC, suffer from this problem. In the second half of 2017 its claims on users were valued at US\$398.45 million (DZD 47.7 billion) compared to US\$299.9 million (DZD 32.717 billion) in 2012 – a 32.87% increase. As for the NSO, it recorded around DZD 2.63 billion of debt and DZD 669 million of claims for the 2017 financial year ([DPAE, 2018](#); [Kherbache, 2020](#)). The NSO complains that the AWC has not been paying sanitation income since 2015, as the charge is comprised within the drinking water bill, knowing that the calculations show that the AWC must pay about 40% of the water bill mainly to the NSO and beneficiaries of the fees ([Boukhari and de Miras, 2019](#)). This jeopardises the financial balance of the NSO. These institutions are industrial and commercial establishments and therefore should be self-financing rather than dependent upon government subsidies. This principle is neglected in Algeria for social and political reasons, resulting in an *institutional accountability gap*. For a long period of time all taxes were transferred into special treasury accounts, in particular the FNEP and FNGIRE, which lack transparency in their management. The World Bank has termed this *transparency gap* the 'black holes' of Algerian public finance, creating an opaque budgetary

¹⁸ Article 173 introduced the drinking water saving tax. It aims to protect water resources quantitatively, to ensure the financing to encourage users to reduce their consumption and wastage.

¹⁹ The water quality protection tax is sometimes corrected by a coefficient of 1–1.5 to acknowledge certain specificities (such as city size and discharge quality and density).

²⁰ Users (irrigators with small and medium hydraulics and unconnected industrial units) who use a borehole, well or any other individual water withdrawal facility.

²¹ The National Water Fund (*fonds national de l'eau [FNE]*) is a special account No. 302–079. It replaces the initial funds, in particular account No. 302–086: National Fund for Integrated Water Resources Management (FNGIRE) and account No. 302–079: National Drinking Water Fund (FNEP), closed by Executive Decree No. 16–162 and article 115 of the Finance Law (2015). The amounts invested as part of the FNE are not included in the study as they were estimated at US\$2.6 billion at current prices from 2014 to 2018.

policy (World Bank, 2007).

4.3. Underutilisation of the WWTPs' capacities: Investment logic taking priority over operations

Water conservation policies must control the volumes discharged by domestic users and treat wastewater emitted by plants. Both are relevant in assessing the achievement of targets 7.C and 7.A of MDG and SDG targets 6.2 and 6.3 related to sanitation. Moreover, wastewater systems collect all kinds of discharge, domestic and industrial, which causes WWTPs to fall into disuse with low maintenance expenditure and unsustainable levels of subsidies. Since the stations are managed either by the NSO or municipalities they have limited financial resources, hence the need for financial sustainability (Perard, 2018).

Investment in the water sector has led to an increase in water supplies and the production of drinking and industrial water (Kherbache and Oukaci, 2017; Akli et al., 2016), and there is significant potential for wastewater to be treated for reuse, the volume of which currently exceeds 1 Bm³. By 2030 wastewater will represent a very significant volume (about 1.8 Bm³) (NWP, 2010; 2011a; 2011b). Assessing the MDGs consists in comparing the quantified objectives with the results according to planning deadlines (Hugon, 2016). Therefore, on one hand we see progress in terms of *hardware* projects; on the other the same is not true for operations, since these operate irregularly as a result of a very high degree of technical sophistication and a lack of management and/or operational skills. Of 45 WWTPs available in Algeria in 2004, 31 were idle for technical reasons (Toumi and Chocat, 2004). In 2009 of the 61 WWTPs managed by the NSO only five were operating continuously and systematically, representing unused capacity (Fig. 3). The WWTPs used 32.5% of the national installed capacity. In other words, of 249.98 Mm³ only 81.15 Mm³ was treated effectively. The degree of capacity underutilisation varies between wilayas: the Oran station recorded a 46%, Tiaret 46.7%, Ouargla 58.9%. It does not exceed 17% for Algiers or Batna, 13% for the wilaya of Saida and 9.7% for Constantine. These discrepancies do not correlate with the investment made between 2000 and 2015 or the discourse around achieving the MDG targets related to sanitation.

It was a similar situation in 2016 when an MREE report (2017)

highlighted that WWTPs were operating at less than 25% capacity. Data from the NWP (2018) show that the average treatment rate in the wilaya of Mascara did not exceed 36% in 2017. Correspondingly, the rate of underutilisation often exceeds 60%, which, according to the MWR and NSO, is due to these stations' weak connection to wastewater collection networks and a cautious approach to unexpected seasonal factors, particularly in coastal areas that experience increased tourist numbers in summer. The MREE (2017) explains the low capacity utilisation by the direct wastewater discharges into the natural environment, network overflows during heavy rainfall and industrial discharges that are poorly recorded and controlled. Priority was given to connecting upstream users to the water treatment system regardless of those downstream. Moreover, construction is carried out with no regard for the principles highlighted in the national water policy. It is already clear that continuing such practice would jeopardise the achievement of SDG Target 6, particularly 6.3. The two indicators used to assess the achievement of this target are the percentage of wastewater treated in a safe manner (indicator 6.3.1) and water quality that does not cause disequilibrium in ecosystem functioning or damage human health (indicator 6.3.2) (Herrera, 2019). The following subsection assesses the latter indicator in terms of public health and ecological sustainability in Algeria.

4.4. Wastewater discharge: A risk to public health and ecological integrity

Wastewater treatment as a constituent part of sanitation has always been neglected in Algeria (not only between 2000 and 2019). Indeed, reports by the MEAT (1995) and CNES (2000) presented catastrophic diagnostics of Algeria's sanitation. They recall that previously sanitation networks were only used to evacuate water, whether rainwater or domestic or industrial wastewater, with no thought to the risk of contaminating water resources or the proliferation of waterborne diseases. Water from coastal cities is discharged directly into the sea, and in other urban areas it goes into wadis and *Sebkhas*. We now observe such practices throughout the country. Given the correlation between population growth and wastewater discharge volumes, the increases have become incompatible with the natural treatment system, hence the threat of groundwater and surface water pollution. In order to reduce

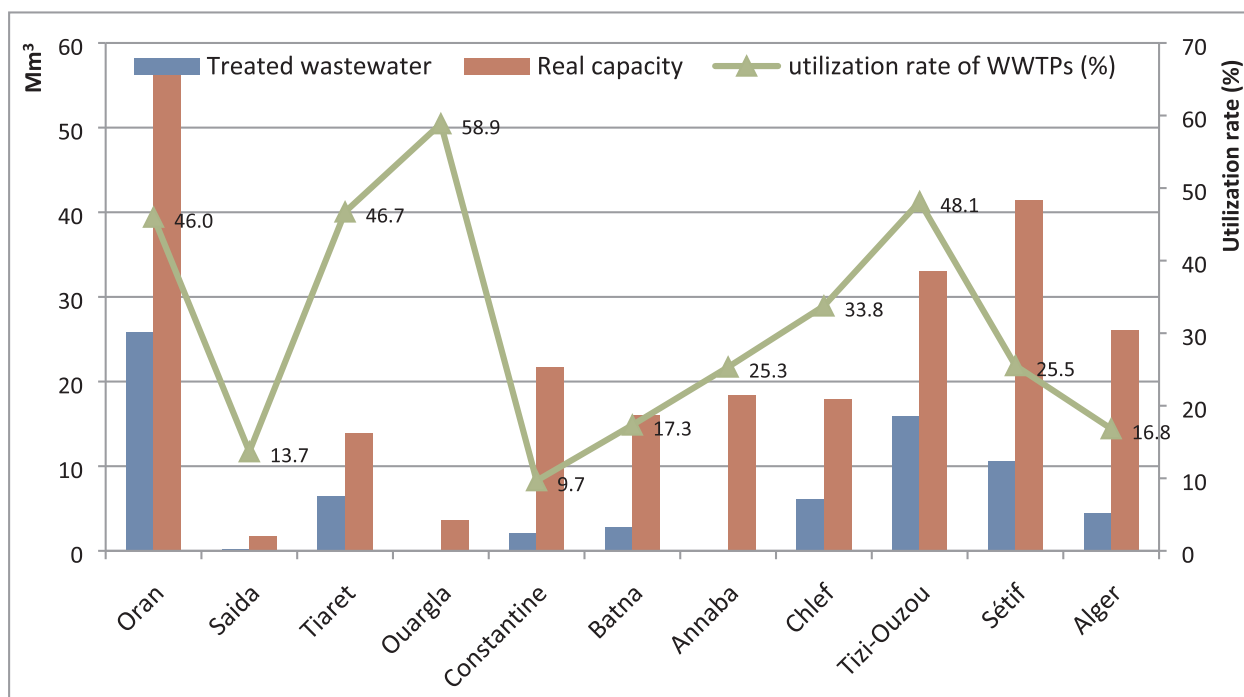


Fig. 3. Performance assessment of some large WWTPs managed by the NSO.

this risk and increase the water supply, purification systems are essential. To this end, WWTPs were planned, albeit only in agglomerate zones (Urban areas), yet the policy has not led to concrete results on the ground. Of the WWTPs built since 2000 most are yet to be connected to the sewerage network – a rate estimated at 40% in 2014 (the objective is to reach 100% by 2030) (Bedrani et al., 2018). Moreover, the lack of significant effort to combine sewerage projects with treatment and reuse installations explains the paradox of the underutilisation of WWTP capacity. The World Bank (2007) recommended that Algeria invest massively in wastewater treatment if it wants to ensure the long-term sustainability of water resources and the protection of this natural capital (UNEP, 2012).

Wastewater is returned to the natural environment without treatment, which poses a danger not only to ecological sustainability or integrity (Flint, 2004) and sustainable development but also to public health. This has led Toumi and Chacat (2004) to suggest that sanitation is very rarely considered from an environmental perspective in Algeria. This failing hinders the achievement of the SDGs since their focus, relative to the MDGs, is the integration of sustainable development. The SDGs are mainly environmental and involve the evaluation of actual results (Hugon, 2016). Indeed, when wastewater is returned without treatment it prevents or restricts potential water use downstream. Several dams in Algeria are currently threatened by pollution owing to the absence or dysfunction of WWTPs upstream, as the case with the Cheurfa II Dam in Mascara. Wastewater in the plains sometimes infiltrates into the groundwater, causing diffuse pollution. The risk of waterborne disease cannot be ruled out. In August 2018 a cholera epidemic broke out several decades after the disease had disappeared in the country. By 6 September 2018 two deaths and 217 hospitalisations had been recorded, according to the Ministry of Health. It was also discovered that some farmers were using raw wastewater for irrigation, despite it being prohibited and severely punishable by law (article 130 of Law No. 05–12). One farmer recounted, ‘my neighbour uses wastewater to irrigate his pomegranate tree and he was almost arrested in flagrante delicto by the national gendarmerie two days ago’²². It is a common practice worldwide, according to the WHO (2018), which estimates that at least 10% of the global population consumes crops irrigated by wastewater.

As a result the investments made have not succeeded in overcoming the wastewater problem. The use of global sanitation indicators to support the public discourse about the achievement of Target 7.C of the MDGs is completely misleading given the complexities and deficiencies in the sanitation subsector, particularly those related to public health and ecological integrity. Even those actions taken in coordination with the European Union (EU) remain insufficient. For example the WATER II programme (*Programme EAU II*), launched in January 2011 and endowed with 30 million euros for 4 years, was intended to support Algeria on sanitation issues. The goal was to promote water protection and reduce the risk of waterborne disease by improving the quality of treated water. By May 2015 Algeria’s water sector had achieved 12 out of 15 indicators (P3A, 2016), the evaluation of which remains simplistic, in our opinion, and is not based on robust or detailed examination. It is important to note that the national strategy regarding the use of treated wastewater for irrigation is focused on expanding the area of irrigated land, increasing agricultural production and preserving surface and groundwater resources. The reuse of treated wastewater (REUE) is prioritised in the water sector strategy and is placed in an adaptive and incentivised framework (MREE, 2017). The objective would be to irrigate more than 100,000 ha with treated wastewater by 2030. The NWP gives 600 Mm³ of REUE by 2030 as a low estimate and 1.2 Bm³ as the highest (NWP, 2010). Nonetheless, in view of the current situation Algeria is not on track to meet the challenge of the SDGs, particularly the sanitation targets.

Several measures could be taken to turn this alarming situation around, and indeed the water police were established under Law No. 05–12 (article 159). Yet, while the code, its enforcement and the penalties are clearly legally defined our interviews with officials and executives revealed that in practice the water police does not exist. Officers are focused on their primary role as hydraulic technicians. The water law remains insufficiently enforced despite a demonstrable proliferation of violations. This inability to implement a legal function shows a *capacity gap* (OECD, 2012; Charbit, 2011; Akhmouch and Correia, 2016) that is one of the governance issues hindering the achievement of SDG 6 (Herrera, 2019). The ongoing lack of effective water policing causes delicate situations where water resources and their use are inventoried. This results in failures in long-term planning (Diaz and Hurlbert, 2013) and in risks to public health. Thus, as the cornerstone in the preservation of the quality and quantity of the resource, the water police must be reactivated urgently.

5. State investment plans by 2030 and SDG sanitation targets: Uncertainty and potential instability in budgetary indicators

Notwithstanding significant investment in the sanitation subsector, whose capital expenditure was around US\$4.38 billion (constant), Algeria could not meet the challenge set in Target 7.C of the MDGs related to sanitation between 2000 and 2015. Certainly, macro-economic indicators reveal positive developments, but local realities have many lacunae. Moreover, there is a discrepancy between the official figures and the facts on the ground. The official assessment of access to sanitation was 81% in 2007 when in reality it was just over 47% (World Bank, 2007). In 2000 a significant gap of 40% existed between urban and rural sanitation connection rates, although the trend was towards lowering this. These facts confirm Hugon’s (2016) argument regarding inconsistencies in the global indicators for a posteriori assessment of the MDGs, and Herrera (2019) argues that their data do not accurately reflect the progress made by countries.

At present the challenge is to address the shortcomings mentioned above and to commit to achieving the targets of the SDGs related to sanitation. Targets 6.2 and 6.3 are directly related: ‘end open defecation and provide access to sanitation and hygiene’ and ‘improve water quality, wastewater treatment, and safe reuse’, while Target 6.5 is indirectly related: ‘implement integrated water resources management’ (UN, 2018). These targets are interdependent with and complement other SDGs. Herrera (2019) sees deficiencies in governance, including local governance, as the main obstacle to achieving the water and sanitation SDGs rather than those related to technology, infrastructure or funding. Nonetheless, the disinvestment and reduced water-sector expenditure in recent years in Algeria are the first signs of difficulty in meeting the SDGs related to the water sector, particularly sanitation, which is at the heart of the 2030 Agenda for Sustainable Development. There are two main reasons for this decline in the state’s financial commitment to the sector. Firstly, the fall in oil prices, which lost about 62% of their value between mid-June 2014 (112 US\$/barrel) and early August 2016 (42.95 US\$/barrel) and 80.6% compared to the price at the beginning of April 24, 2020 (21.77 US\$/barrel) that was impacted drastically by the coronavirus pandemic (COVID-19 effect) and other factors. Secondly, the devaluation of the Algerian dinar against the US dollar in recent years has resulted in a substantial erosion of oil export revenues, from US\$79.3 billion in 2008 to US\$30 billion in 2016 before rising to US\$41.2 billion in 2018. According to the Bank of Algeria, there has also been a depletion of foreign exchange reserves, which fell from US\$193 billion in May 2014 to less than US\$51.6 billion in May 2020 – a decrease of 73.3%. Reserves are expected to decrease further, reaching US\$40 billion by the end of 2020. Algeria is facing twin deficits: a growing budget deficit with high public expenditure mainly on service subsidies, including water and sanitation, and an ever-increasing current account deficit. These factors call for an urgent programme of endogenous water-sector financing – a complicated task

²² Interviewed on June 17, 2019 in Beni Yahi (Mostaganem).

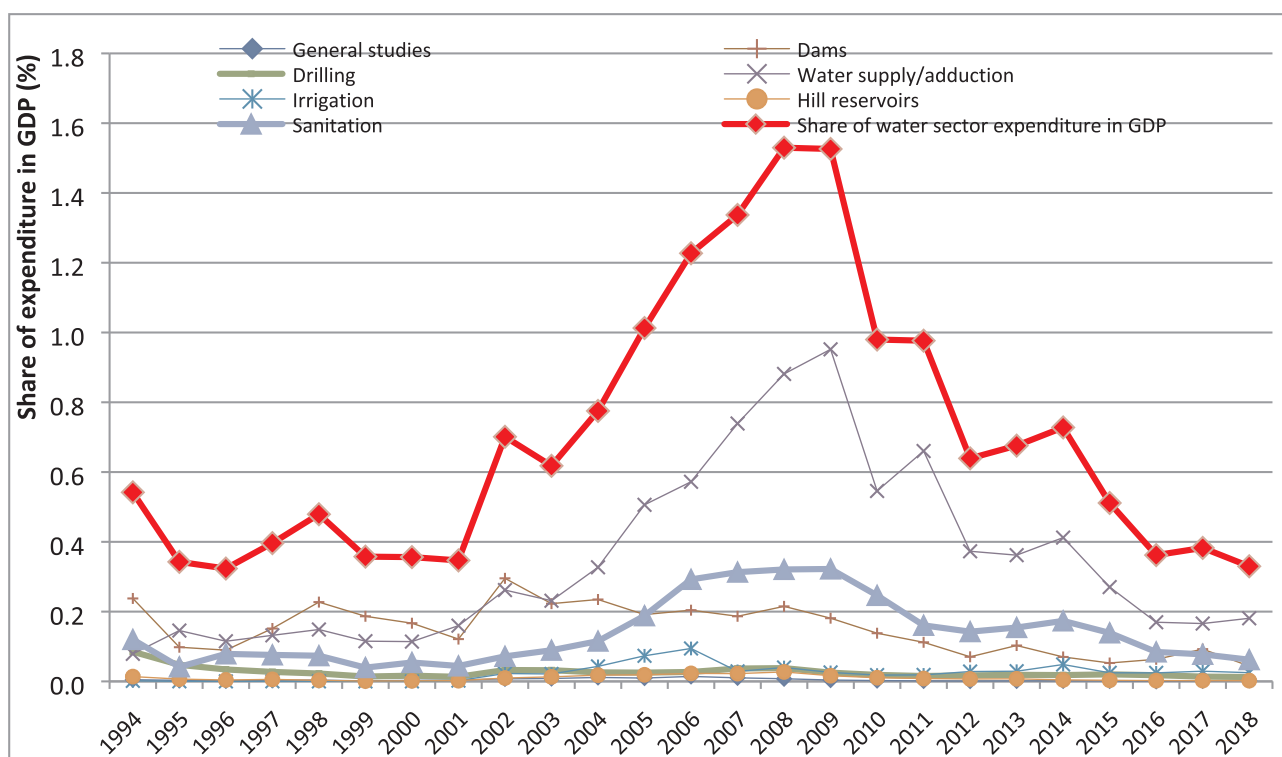


Fig. 4. Share of the water sector and subsector investment expenditure in real GDP between 1994 and 2018.

given Algeria's current revolution and political instability aggravating its economic difficulties. Moreover, the main factors preventing the achievement of the MDGs, and likely to undermine the SDGs, in some countries are exogenous and mostly linked to conflict, increased military spending, political-economic crises and natural disasters due to climate change (Hugon, 2016; Nhamo et al., 2019).

In the current economic situation it is hard to predict when the downward trend in investment in the sector will be stopped. The outlook for the Algerian economy is uncertain and, in our opinion, a return to external debt to finance public investment is only a matter of time. The share of GDP allocated to water follows the same trend as real GDP increases. Thus, we compared Algeria's real GDP data with real expenditure in the water sector. Investment ranged from 0.34% to 0.48% of GDP for the period 1995 to 2001 (Fig. 4), and from 2002 onwards there was a steady increase to a threshold of 1.53% in 2008. However, a restrictive policy introduced in 2009 caused a decline in the share of GDP, and it stagnated at around 0.36%, 0.38% and 0.33% for the first three years of the implementation of the SDGs (2016, 2017 and 2018). This level of investment is comparable to the 1990s and early 2000s prior to the launch of the economic recovery programmes. Moreover, 2003 to 2014 represented a period of 'hydraulic catch-up', overcoming economic water scarcity due to low budgets allocated to the sector between 1990 and 1999. In practice, the sector's share of GDP did not exceed 0.4%²³ – patent underfunding that pushed it into chaos.

The disaggregation of investment data in the water sector showed that no subsector was spared the decline, including the priority subsectors, namely drinking water and sanitation. In terms of GDP the level of investment in sanitation over the first three years of the implementation of the SDGs (2016–2018) corresponds to the overall trend in the sector, i.e. a level comparable to the 1990s and early 2000s. The water sector's investment share grew between 2004 and 2015, ranging from 0.12% in 2004 to 0.32% in 2008 and 2009 before declining for the

remainder of the study period with about 0.08% in 2016 and 2017. The decline continued in 2018 with 0.06% – less than the average GDP share designated by low- and middle-income countries, such as Algeria, estimated at 0.1% (Perard, 2018).

Despite the achievements of previous years in the sector, water will remain a real challenge for Algeria and represent the Achilles heel of any development policy for the next few decades. For this reason the NWP and the new water sector strategy adopted under the NMCE (MREE, 2017) have assessed the financial needs by 2030. Part of the planning has already been realised through the ministry's action plan for 2016 to 2022, which aims, among other things, to ensure access to sanitation services and sustainable development. Actual investment expenditure between 2016 and 2018 was estimated at US\$165.43 million, US\$154.42 million and US\$125.84 million respectively, representing an annual average of US\$148.56 million (constant) (Fig. 2 above).

By 2030 investment in the sanitation subsector is estimated at 3486 billion DZD, divided between the construction of WWTPs (44%), sewerage networks (48%) and studies (8%), based on the National Sanitation Development Plan (NSDP). This programme is divided into three quinquennia periods, namely 2015–2019, with a total investment of DZD 827 billion (24%) and an annual average of DZD 165.4 billion, 2020–2024, with DZD 1428 billion (41%) (or DZD 285.6 billion/year) and 2025–2030, with planned investment of DZD 1231 billion (35%) and an annual average of DZD 246.2 billion. Added to the NSDP figures is estimated expenditure, according to the NWP, of 89 billion DZD, giving a total of 3575 billion DZD.

Such investment envelopes appear significant. The MREE (2017) mentions a fourfold increase in planned investment compared to the 2001 to 2013 period. Yet, deflation has shown otherwise, and the situation is in fact deteriorating year on year. For the sake of comparison, and because the plans are based on current prices, we deflated the amounts for the first quinquennial period, namely the Economic Growth Support Programme (EGSP) (2015–2019), and then converted them into US \$ (Table 2). The objective was to highlight the funding gap in the first three years following the entry into force of the SDGs

²³ These estimates are lower than the World Bank's (2007) as our valuation is based on constant prices.

Table 2

Funding/investment gap between planned programmes and real investment expenditure on sanitation between 2015 and 2018.

	2015	2016	2017	2018
Average projected expenditure at current prices between 2015 and 2018 (DZD billion)	165.4	165.4	165.4	165.4
Gross National Expenditure Deflator (%)	206.54	217.93	223.4	229.01
Exchange rate from DZD to US\$	100.69	109.44	110.97	118.20
Projected expenditure at constant price (US\$ million)	795.32	693.49	667.18	611.03
Real expenditure at constant price (US\$ million)	263.79	165.43	154.42	125.84
Funding gap (%)	201.49	319.2	332.05	385.56

Source: authors' calculations (2019).

because an assessment of the SDGs (or MDGs) compares the departure points in terms of initial targets and the arrival points in terms of observed performance (Hugon, 2016). In relation to the financial needs of the sanitation subsector there was an increasing investment deficit with the devaluation of the dinar, estimated at 201.5% in 2015 and 319.2% in 2016. The deficit was estimated at 332% in 2017 and 385.56% in 2018, undermining the achievement of targets 6.2 and 6.3 of SDG 6 related to sanitation and presenting a major obstacle to multi-level governance and the achievement of other, related SDGs (OECD, 2012; Charbit, 2011). This period is marked by a trend of increasing deficit in relation to planning objectives in the sanitation subsector.

The quinquennial periods to 2030 have estimated annual investment requirements of DZD 285.6 billion current for 2020 to 2024 and DZD 246.2 billion current for 2025 to 2030, even while taking the *ceteris paribus* clause of deflator and exchange rates into account, meaning the funding gap will remain considerable, and higher than the EGSP (2015–2019). Moreover, in 2018 and 2019 no improvement was observed in Algeria's budgetary indicators. The lack of available funds is not specific to Algeria, however. The World Bank has estimated that US\$41.7 billion would be needed to meet SDG 6, which is far from being reached in most countries, particularly in Africa (Nhamo et al., 2019). It has already become an essential requirement that other instruments be used in the sanitation subsector, such as effective user contributions to the real cost of sanitation and wastewater treatment, effective management in resolving bottlenecks, and transparency in budgeting and providing technical and economic information. These elements are the key to Algeria's fulfillment of the 2030 Agenda for Sustainable Development and the achievement of the SDG targets related to sanitation. These targets are directly referred to in the water sector strategy, whose aims are: to provide sanitation services to the whole population, to protect public health and to improve the collection and treatment of all liquid effluents in accordance with environmental protection requirements (MREE, 2017). However, their generality and the lack of a hierarchy of priority may well hinder their achievement (Herrera, 2019).

6. Conclusion

Estimating Algeria's capital expenditure requirements is complicated by the facts that gaining access to financial data can be impossible and the actual state of water and sanitation services can contradict the official discourse. This article aimed to overcome these limitations as far as possible through semi-structured interviews and data comparison/combination work. While undeniable efforts have been made in the field of sanitation, this study has highlighted significant gaps between the official discourse, which holds that Algeria achieved Target 7.C of the MDGs related to drinking water and sanitation ahead of their deadlines in 2015, and the reality, in which numerous bottlenecks hamper the provision of services. Admittedly, in prioritising sanitation the PIPs introduced in 2000 have led to some improvements (Law No. 05–12).

Sanitation in Algeria continues to suffer from shortcomings in its multi-level governance. Capital-intensive projects have been carried out in the sanitation subsector without users feeling the benefit in terms of

services due to the absolute primacy given to investment policy over infrastructure operation policy. The subsector's logic is 'equipment for equipping', without worrying whether projects serve any purpose. Decision-makers have therefore favoured a technical model of supply-side management, usually with drastically low budget for O&M and large subsidies for services.

These trends are set to continue in the programme's major development projects by 2030, which coincides with the 2030 Agenda for Sustainable Development. The sanitation subsector has been in a phase of disinvestment since 2009, and levels are now comparable to those of the 1990s and early 2000s, prior to the implementation of the PIPs (the actual expenditure per capita was US\$3 in 2018). The flaw in Algeria's policy is that it is fundamentally based on state investment and is therefore strongly correlated with oil prices. Having dropped around 80.6% since mid-June 2014, oil prices indirectly caused a devaluation of the Algerian dinar, which has lost 59.8% of its value since 2014, resulting in over-costs and recurring revaluation operations during the implementation of the sanitation projects. This situation is leading to the erosion and gradual drying-up of foreign exchange reserves, which declined by 73.3% between May 2014 and May 2020. Thus, we recommend more efficient allocation and use of available financial resources, especially in this crisis context.

Since current financing does not take a real cost-recovery approach, it complicates the functioning of the infrastructure. In short, at the current rate of investment, and if subsector weaknesses are not quickly addressed, the SDG targets related to sanitation are far from being met. The indicators are not positive, particularly in the current economic climate, with significant uncertainty over funding, and the political instability of a popular uprising. Calling for the regime's departure, the 'revolution of smiles', if successful, would be likely to lead to an overhaul of the planning frameworks currently in place. We call for an improvement in the cost-recovery of sanitation services in accordance with a water policy based on the real cost of such services as the collection and treatment of wastewater (article 3 of Law No. 05–12). Thus, subsidies must be targeted, according to capacity, at the most vulnerable populations. This approach would allow at least O&M costs to be covered.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Acknowledgements

This article and the research on which it is based were supported by Ministry of Higher Education & Scientific Research of Algeria (MESRS), Ministry of Water Resource of Algeria (MWR) and the *Institut de Recherche pour le Développement (IRD)* in France namely the UMR G-EAU of Montpellier. We would like to thank the managers and officials of the MWR who gave us access to the data needed for this work and participated in the various interviews that we conducted in the body. A special thanks for Pr. François MOLLE for the supervision during my

residential training at UMR G-EAU (Montpellier) and for Thanawat BREMARD for reviewing the article.

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